are in favor of the mutation theory of the origin of plant species. 'The Coincident Distribution of Related Species of Pelagic Organisms as illustrated by the Chætognatha' is by Charles A. Kofoid, who shows that there is a tendency for two species of a genus of this group to occur in one locality and not elsewhere, and considers that this casts some doubt on the universality of operation of isolation in the evolution of species. E. A. Andrews describes at some length 'The Attached Young of the Crayfish, *Cambarus clarkii* and *Cambarus diogenes*' and considers their bearing on the question of the evolution of the species.

The American Museum Journal for May is mainly devoted to an article by Clark Wissler on 'The Douglas African Collection' recently acquired by the museum through the generosity of some of its friends.

The Bulletin of the Charleston Museum for April contains an account, by Ezra Brainerd, of 'A Visit to the Grave of Thomas Walter,' one of the earliest of American botanists and the author of Flora Carolina. A pleasant result of this visit has been the taking of steps for the preservation and protection of the grave.

The Peabody Museum of Natural History, Yale University, has just issued Guide No. 1 on 'The Evolution of the Horse Family,' by Richard S. Lull, and based on the valuable material mainly brought together by Professor Marsh, and recently admirably arranged and labeled by Dr. Lull.

SOCIETIES AND ACADEMIES

THE AMERICAN CHEMICAL SOCIETY. NEW YORK SECTION

The seventh regular meeting of the session of 1906–'07 was held at the Chemists' Club, 108 West 55th Street, on May 10.

The following papers were presented:

The Causes of the Corrosion of Iron and Steel: W. H. Walker.

With the ever-increasing use of iron and steel, the conditions which limit the life of structures made from these materials, assume great importance. To few subjects have been devoted so much elaborate investigation with such conflicting results. Of the many papers which have been published and theories advanced as to the cause of corrosion, the three following are of special importance: Calvert, after a series of experiments came to the conclusion that ordinary corrosion or rusting of iron could take place only when all of the three reagents, carbon dioxide, water and oxygen were present. This opinion was universally accepted until in 1903 Whitney showed that corrosion was a purely electrochemical phenomenon and would take place in water in the absence of both oxygen and carbon dioxide, although for the formation of the so-called rust, oxygen was necessary. A year or so later Dunstan and his co-workers published the results of their work from which they concluded that Whitney was at fault and that iron was not corroded by water in the absence of oxygen and carbon dioxide. They believed the action of oxygen on iron to be a direct one, with the intermediate formation of hydrogen peroxide, and that in ordinary corrosion electrochemistry does not play a part. Following this paper came one from Moody, of Kensington, England, who took issue with both Whitney and Dunstan and describes experiments which he thinks conclusively prove that no corrosion of any kind takes place in the total absence of carbon dioxide.

Work recently carried on at the Institute of Technology substantiates Whitney's claim in so far that there is a slight corrosion of iron in pure water although if oxygen and carbon dioxide be most carefully eliminated, the presence of dissolved iron can be detected only with the greatest care, and possibly if these two constituents were absolutely removed, no iron would be dissolved. There is a tendency, however, for iron to pass into solution and for hydrogen to precipitate out in a way analogous to the action of iron in a copper sulphate solution. Unless oxygen or some other substance be present to unite with the hydrogen when set free upon the surface of the iron, the action, if it starts at all, very soon ceases. To remove this hydrogen and thus accelerate the action is the function of oxygen in corrosion.

Experiments show that the rapidity of corrosion is directly proportional to the partial pressure of the oxygen in the atmosphere above the water containing the iron and therefore in the water. A reagent which indicates very clearly those portions of the iron at which iron ions are passing into solution, on the one hand, and where hydrogen is passing out of solution with the formation of hydroxyl, on the other hand, was found in ordinary tap-water containing a little phenolphthalein and potassium ferricyanide. The red and blue zones are quickly apparent when any piece of iron is immersed in this solution, and can be rendered more or less permanent if the solution be thickened with gelatin or agar-agar.

The potential difference which has often been observed between iron and iron oxide, is shown to be occasioned by the unequal condensation of oxygen upon the two surfaces. For example, magnetic oxide of iron which, under ordinary circumstances in connection with iron, shows a large difference of potential in water or weak electrolyte, indicates no difference when the system is entirely free from oxygen.

Differences of potential which can easily be observed upon different portions of an iron plate, may be also explained by the varying capacity of different portions of the iron for occluding or segregating oxygen.

The electrochemical theory is substantiated by showing that any reagent which increases the concentration of the hydrogen ions will increase the rate of corrosion, while reagents which decrease this, inhibit corrosion. The fact that bichromate and chromic acid inhibit rusting, may be explained by the formation of an enclosing film of oxygen evenly distributed over the surface in a way analogous to that which may be formed by immersion in nitric acid.

The Analysis of Chlorides and Sulphocyanate Mixtures: M. A. ROSANOFF and ARTHUR E. HILL.

To analyze chloride and sulphocyanate mixtures is to-day a difficult matter. The known gravimetric methods are laborious. The known volumetric methods are but little more rapid and far from precise. The authors have devised a new volumetric method, which is easy of execution and yields results of the highest precision. Its basal facts are as follows: (1) At the temperature of boiling water soluble sulphocyanates are readily oxidized by small quantities of nitric acid; (2) *most* of the hydrocyanic acid produced can be expelled in a short time by boiling; (3) no hydrochloric acid is lost, owing to complete electrolytic dissociation; (4) silver cyanide is somewhat soluble, silver chloride is insoluble, in moderately dilute nitric acid.

The method can be used to determine chlorides in the presence of both sulphocyanates and cyanides, and the authors are endeavoring to extend it to the determination of bromides. Details of the *modus operandi* will shortly appear in the *Journal of the American Chemical Society.*

Gasoline-Soap 'Emulsions' and their Relation to Sewer Explosions: A. A. BRENEMAN.

The 'emulsion' produced by shaking up gasoline or benzine with soap solutions gathers slowly upon the surface of the aqueous liquid forming a thick, creamy paste which is very permanent in closed vessels but disintegrates rapidly on exposure to air by volatilization of the hydrocarbon. The ordinary operation of washing the hands with soap after benzine or gasoline has been used to remove grease, carries off the light liquid as an emulsion. This same emulsion can be made in quantity by shaking up gasoline with a weak soap solution in a stoppered glass cylinder. It then rises in an hour or less to form a thick, white, creamy layer which can be drawn off and kept separately. In this condition it is very permanent, requiring many days to effect an appreciable further separation. Under the microscope it shows a mass of air bubbles studded or coated with minute globules of gasoline. The air within the bubbles is saturated with vapor of gasoline, the soap solution is indifferent to it, and vapor pressure is at an equilibrium throughout the system. The permanence of the mass in a closed vessel is therefore to be expected. In the open air it disintegrates rapidly, giving off gasoline

vapor. The entrance of this material into drains and sewers where gasoline and soap are used for washing, as in garrages and factories, is sufficient to account for the liberation of much combustible vapor and hence, perhaps, for explosions. Such material separates slowly and is difficult to trap.

Professor Breneman also read two 'laboratory notes,' one relating to the magnetic quality of magnetic (iron) oxide in the hydrated state, and one upon the use of ether in the ferric sulphocyanate test.

C. M. JOYCE,
Secretary

THE TORREY BOTANICAL CLUB

THE club was called to order on February 27, 1907, at 3:30 P.M., at the Museum Building of the New York Botanical Garden, with Dr. William A. Murrill in the chair. Twenty-one persons were present.

The following scientific program was presented:

Tubular Glands in the Corn Embryo: C. STUART GAGER.

The literature dealing with the transformation of starch to sugar in the corn grain during germination was first briefly reviewed, and its bearing on the structural anomaly subsequently described was pointed out. This anomaly consisted of invaginations of the glandular epithelium of the scutellum into the tissue of the latter, in such a way as to form true glands of the tubular and subracemose type.

The significance of these glands, as in harmony with the theory that the scutellar epithelium is principally an organ of secretion, was also indicated. The paper was illustrated by microscopic preparations and photomicrographs, and will be published in full in the *Bulletin* of the club for March, 1907.

A brief discussion followed.

Explorations in Southern Florida: JOHN K. SMALL.

The exploration was confined to the larger group of islands lying between Miami and Camps Longview and Jackson, and to a wholly unexplored section of the everglades lying between the present terminus of the Florida East Coast Railway and Key Largo, including a portion of Cross Key. This latter island, together with a parallel and almost similar formation, constitutes the only natural and approximately complete land-connection between the Florida Keys and the mainland of the peninsula. The chain of everglade keys is a miniature of the Florida Keys, both in its crescent shape and its flora, and also of the West Indies in the character of its vegetation. It is surrounded by the everglades, except where the upper islands touch Biscayne Bay at points from Miami to Cutler. Before these islands were elevated to their present altitude, they were probably surrounded by a shallow sea, just as the Florida Keys are at the present time. This being the case, the tropical American flora now inhabiting them may easily be accounted for. After sufficient elevation had taken place, the surrounding sea was transformed into the vast spring now known as the everglades. Conditions becoming favorable, the plants of the flora of northern peninsular Florida advanced southward and naturally took complete possession of the area that was formerly the sea, thus surrounding and isolating the wholly different flora of the islands. In fact, the two floras are so sharply delimited that one can often stand with one foot on plants characteristic of the high northern regions and the other on plants restricted to the tropics. It is not an uncommon experience to see colonies of plants common in Canada, such as the arrowarum (*Peltandra*), the lizard's tail (*Saururus*) and the ground-nut (*Apios*), growing side by side with tropical palms, cycads, orchids and bromeliads.

The total area of these islands is perhaps about one hundred and fifty square miles. Those that have been explored have yielded between five and six hundred species of native flowering plants, surely a very large number considering the fact that the solid rock is exposed everywhere and that soil in the ordinary sense of the word does not occur there. The close relationship of this flora to that of the West Indies is now established by the fact that considerably more than one half of the

species found on the islands south of Miami are also native in Cuba and the Bahamas.

Since the publication of Dr. Small's last report on exploration in southern Florida, and a subsequently printed paper on the species added to the flora of that state, he has secured over fifty more species not before known to grow on the North American mainland. Eight or ten of these are complete novelties, inasmuch as they are not yet described. Noteworthy among the recent collections, which make an aggregate of 3,200 specimens, are seven species not previously included in the tree flora of the United States.

After an interesting discussion of Dr. Small's paper the club adjourned at five o'clock.

C. STUART GAGER,
Secretary

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 430th meeting was held April 20, 1907, with President Stejneger presiding.

The first paper, by Mr. George B. Morse, was entitled 'Preliminary Observations on the Quail Disease in the United States.'

The speaker quoted from a booklet entitled 'Quail Culture from A to Z,' published in 1905; "There is no contagious disease among quail that has yet made its appearance. * * * They have lice, but not disease." The facts recorded in these observations are a complete refutation of that statement. In April, 1906, there were received from a Washington dealer three dead bobwhites, the last of a large number that had been steadily falling victims to a highly contagious and rapidly fatal disease. In May, 1906, and January, 1907, letters were received from Boston, Mass., and Worcester, Mass., referring to what was undoubtedly the same disease. From February 11, 1907, to March 21, 1907, two dealers in Washington lost upwards of 250 bobwhites, and quite a number each of several other species of quail. Post-mortem examination revealed the same lesions in all. The sources from which these birds were received demonstrated as known centers of infection Alexander City and Dadeville, Tallapoosa County, and Birmingham, Jefferson County, Ala.; Wichita, Kans.; and Marlow, Chickasaw Nation, Ind. T. In addition to the above, other localities such as Washington, D. C., Boston and Worcester, Mass., Elizabeth, Pa., and Yarmouth, Nova Scotia, have become more or less infected by means of shipments of diseased birds received. The disease has been thus far demonstrated in the following species: bobwhite (*Colinus virginianus*), California quail (*Lophortyx californicus vallicola*), Gambel quail (*Lophortyx gambeli*), mountain quail (*Oreortyx pictus*), scaled quail, 'cotton-top' or blue quail (*Callipepla squamata*) and the sharp-tailed grouse (*Pediocœtes phasianellus campestris*).

Period of incubation appears to be about ten days. Symptoms are: dullness, fluffed feathers, neglect of food. In acute cases (the most common) death occurs within two or three days. In chronic cases diarrhœa occurs and emaciation is extreme. At post-mortem examination the characteristic lesions are pulmonary congestion, superficial necroses of the liver and intestinal ulceration. Bacteriologic investigation of the cases studied in 1906 resulted in the isolation of a bacillus apparently identical with Klein's bacillus of grouse disease. The cases studied in 1907 yielded with striking unanimity a variant of *Bacillus coli* with which the author has produced death in mice, guinea-pigs and bobwhites with the characteristic lesions. The disease was therefore spoken of as an infectious disease of the grouse family produced by a member of the *B. coli* group, described in circular No. 109, of the Bureau of Animal Industry. No curative treatment was offered but procedures for prevention were outlined, methods applicable to the prevention of disease of intestinal origin among all wild birds brought under habits of life more restricted than those normally enjoyed.

Dr. T. S. Palmer referred to the importance of the establishment of this disease among American quail, as the grouse disease is established in Europe. When first heard of last autumn it was supposed the grouse disease had been imported. During the past ten years there has been a marked decrease in abundance of quail, particularly following severe winters and there is a large demand for birds to re-

stock, reaching from 100,000 to 200,000 annually. Shipments from the supply centers, as Texas, Indian Territory and Alabama, are liable to be centers of quail disease infection, and in this case shipments may be discontinued by law.

The second paper was by Dr. F. V. Coville on 'Photographic Reproduction of Rare Botanical Books.' He referred to the desirability of having reproductions of rare and valuable works to which frequent reference is made, in order to preserve the originals. These were made by photographing each page and binding the resulting prints into a book. Specimens of such reproductions were exhibited. These had been made for actual use in botanical work, some of them so closely simulating the original as to scarcely show they were photographs. Pages yellowed by age, however, show black or dark in the reproduction.

The third paper, by Mr. R. E. C. Stearns on 'The Composition and Decomposition of Fresh Water Mussel Shells, with Notes and Queries,' was read by Dr. Palmer in the absence of the author. It will be published in full in the *Proceedings* of the society.

M. C. MARSH,
Recording Secretary

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 634th meeting was held on April 27, 1907, President Hayford in the chair. The society heard an address by Dr. H. W. Wiley, upon the subject of 'How Much Do We Eat?' After briefly mentioning, without discussion, the three principal schools of philosophy relative to man's food consumption, the speaker proposed three points of discussion having a direct bearing upon the subject of how much do we eat, *viz*: the proper proportions of food necessary for growth; for equilibrium of weight, and for old age; the second only of these three was discussed at length. The speaker reviewed briefly the experiments carried out under his direction, where records have been kept for nearly five years of the quantities of food eaten by healthy young men. Some fifty or sixty young men have been under observation during this period, and all the food which they have eaten has been carefully weighed.

In the fore period, preliminary to the observations, the ration which the young men would normally choose was changed one way or the other in order to secure the equilibrium desired. The proportion of protein to the other elements of the ration was selected by the normal taste of the subject, save in some instances where there seemed to be a tendency to eat too much meat, this was slightly checked. A sample of all the results shows that the dry food eaten by a man each day is almost one per cent. of the weight of the body. In other words, a young man weighing 150 pounds will eat in twenty-four hours 1.5 pounds of dry food. The weight of moist food, including water, is almost exactly 4.25 per cent. of the weight of the body. The total amount, therefore, of food and drink in the state in which the food is consumed for a young man of 150 pounds in twenty-four hours is about 6.4 pounds. In other words, the amount of water taken in his food and drink during the day is nearly 5 pounds.

Important questions of social and scientific character arise in connection with the magnitude of the diet. Interesting observations have lately been made looking to the diminution of the quantity of food eaten per day. Mr. H. Fletcher has made interesting observations on this subject, and has sought to show that the quantity of food ordinarily eaten is too great. He calls attention to the fact that slow and patient mastication may suffice to make a less quantity of food satisfy hunger, and furnish the necessary heat and energy for the ordinary human activities. Mr. Fletcher himself submitted to experimental investigations in the calorimeter at Middletown, Conn. The data furnished by the calorimeter indicated that more heat was evolved than could possibly have been furnished by the quantity of food claimed to be eaten.

Of course, it is not possible that a man may live without damage on less food than would furnish the heat and energy for the ordinary activities of life. There must necessarily in this case be a waste and the waste

can only be made from the tissues themselves.

The recent investigations of Professor Chittenden must be taken into consideration, where it was demonstrated that strength and body equilibrium could be secured by cutting down very materially the nitrogenous part of the ration. Some of these experiments were continued over a long period of time, and showed that strength even increased with the notable diminution of the nitrogenous elements consumed. This is all interesting, but probably not convincing. If we, for the sake of argument, assume that the theory of evolution is a correct one, then we must admit that man to a certain degree is a creature of his environment. Experience shows that when the human animal is allowed to choose his ration with reasonable facility to get what he wants he eats a certain weight of food in which there is a certain proportion of nitrogen, which it may be said for a man of 150 pounds is not far from 18 grams per day. What would be the effect upon the human animal of cutting this nitrogen out by one third or one half in the course of a few generations or of a few thousand or hundreds of thousands of years? It would, perhaps, change in a very marked degree the human animal. That change might be possibly for the better, but certainly it would not represent the animal himself as he is to-day.

I have just read in the newspapers, which are not always the most reliable purveyors of scientific information, that the recruiting officers in the German Empire have found very few young men in a certain locality suitable for military service, and the inference is that the high price of meat has probably excluded it from the ordinary diet of the peasant, so that the children of the peasants are not receiving the amount of meat food, and presumably of nitrogenous material, which they formerly were able to get. This report, of course, is not worthy of being considered from a scientific point of view, but it shows at least an indication of the trend of thought in this matter.

The best nourished nations, as a rule, are foremost in literature, science and arts, and, according to numbers, in physical power.

Those who treat of diet from an economic, as well as scientific point of view, should be very conservative in advocating any change in rations which would lead to a minimum diet naturally chosen or to a reduction of the proportion of nitrogen to the other constitutents therein.

R. L. FARIS,
Secretary

DISCUSSION AND CORRESPONDENCE

A PROTEST ON BEHALF OF THE SYSTEMATIC ZOOLOGIST AND THE BIBLIOGRAPHER

A PAPER recently come to hand on the Nearctic Hemerobiidæ, *Transactions of the American Entomological Society,* XXXII., pp. 21–52, furnishes an opportunity for a criticism that is not intended for the author in particular, but as a protest against a particular kind of carelessness that we meet with too frequently in present zoological literature. On page 40 of that paper is described what appears to be a new genus, and is so indicated by the abbreviation 'n. gen.' placed after the name. No other reference to the use of the name is indicated. Any bibliographer or future worker would be very justifiably led into the error of dating this genus, and of the several others in the paper which are all treated in the same way, from December, 1905, the date of the paper. But on turning to page 46, we are told in a brief appended note that Dr. Needham has in July, 1905, described this genus under another name. It is then explained that the author published the name of this genus, as well as of the others published in the paper under discussion, in connection with the name of a described species, as early as November, 1904, and that therefore Dr. Needham's name is a synonym. I find no fault with this conclusion, but why I ask, and I demand it in the name of the systematist and of the bibliographer, does he not indicate the date from which the genus originates in the early part of his paper? Why does he indicate as a new genus that which from the standpoint of nomenclature he has described a year earlier?

Take another instance. Dr. Ashmead in